

### ABSTRACT OF THE INVENTION

A method to speed-up IP destination address lookup. The method is a natural extension of IP, requires 5 bits in the IP header (IPv4, 7 in IPv6) and performs IP lookup nearly as fast as IP/Tag-switching but with a smaller memory requirement. According to the present invention, each router adds a "clue" to each data packet, telling its downstream router where it ended the IP lookup. Since the forwarding tables of neighboring routers are similar, the clue either directly determines the best prefix match for the downstream router, or provides the downstream router with a good point to start its IP lookup. The new scheme thus prevents repeated computations and distributes the lookup process across the routers along the data packet path. Each router starts the lookup computation at the point its up-stream neighbor has finished. Furthermore, the new scheme is easily assimilated into heterogeneous IP networks, does not require routers coordination, and requires no setup time. Even a flow of one data packet enjoys the benefits of the scheme without any additional overhead. The speedup achieved in the present invention is about 10 times faster than current standard techniques.